

# IOWA DOT

## Transportation Systems Management and Operations

September 11, 2015

Scott Marler, Office of Traffic Operations

Ramada Tropics Resort and Conference Center  
Des Moines





## REAL TIME

**PROACTIVE**

# WHY?









# WHY?

## 1. Safety



# BY THE NUMBERS

32,719

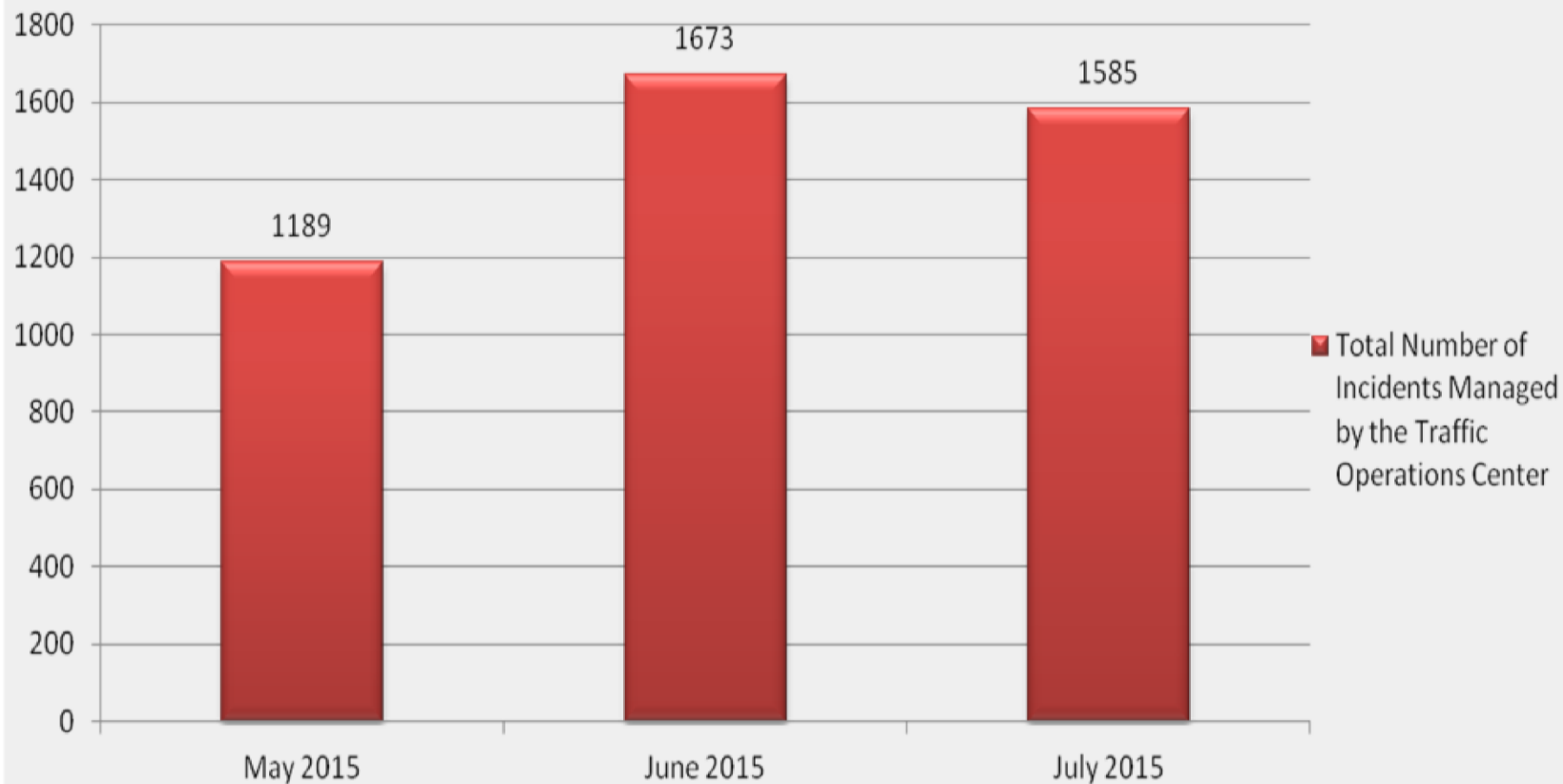
2013 Nationwide Traffic Fatalities

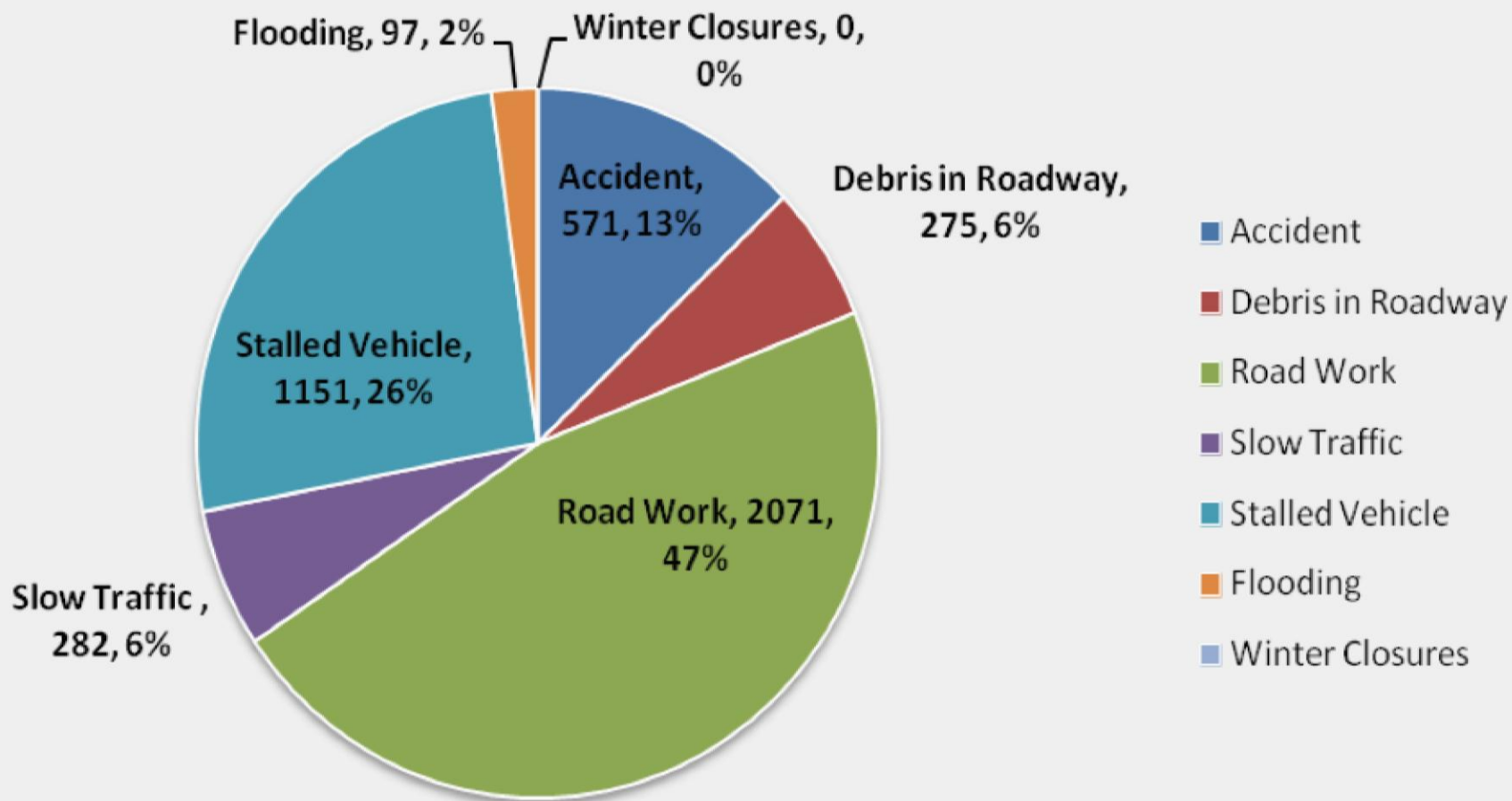
321

2014 Iowa Traffic Fatalities

224

2015 Iowa Traffic Fatalities to Date





# BY THE NUMBERS

# 1,482

Average Incidents Per Month for May/June/July

# BY THE NUMBERS

1,482

Average Incidents Per Month for May/June/July

1:4

Ratio of Lane Blockage to Delay



# BY THE NUMBERS

1,482

Average Incidents Per Month for May/June/July

1:4

Ratio of Lane Blockage to Delay

2.8%

Per Minute Likelihood of a Secondary Crash

## BY THE NUMBERS

1,482

Average Incidents Per Month for May/June/July

1:4

Ratio of Lane Blockage to Delay

2.8%

Per Minute Likelihood of a Secondary Crash

30-40

Number of Minutes Till 100% Likelihood

# WHY?

1. Safety

2. Reliability

# BY THE NUMBERS

# \$406 b

Annual Value of Goods Shipped through Iowa

## BY THE NUMBERS

\$406 b

Annual Value of Goods Shipped through Iowa

89%

Freight Tonnage by Truck



## BY THE NUMBERS

\$406 b

Annual Value of Goods Shipped through Iowa

89%

Freight Tonnage by Truck

43%

Growth of Truck Freight Tonnage

## BY THE NUMBERS

\$406 b

Annual Value of Goods Shipped through Iowa

89%

Freight Tonnage by Truck

43%

Growth of Truck Freight Tonnage

\$380 m

Annual Cost of Congestion in Iowa

## BY THE NUMBERS

\$406 b

Annual Value of Goods Shipped through Iowa

89%

Freight Tonnage by Truck

43%

Growth of Truck Freight Tonnage

\$380 m

Annual Cost of Congestion in Iowa

\$654 m

Financial Cost of Traffic Crashes in Iowa

# Traffic Operations Center 24/7/365

- Heart of traffic incident management
- Detect, verify, notify, respond
- Field Communications
- Multi-agency coordination
- Unified Command



# Our Methods:

**Cameras**

**Sensors**

**Dynamic  
Message Signs**

**Portable DMS**

**ATMS Software**

**Communication  
Systems**

**Video Wall  
Technologies**

**Traffic Services  
and Software**

**TEAM WORK**





Traveler Information System

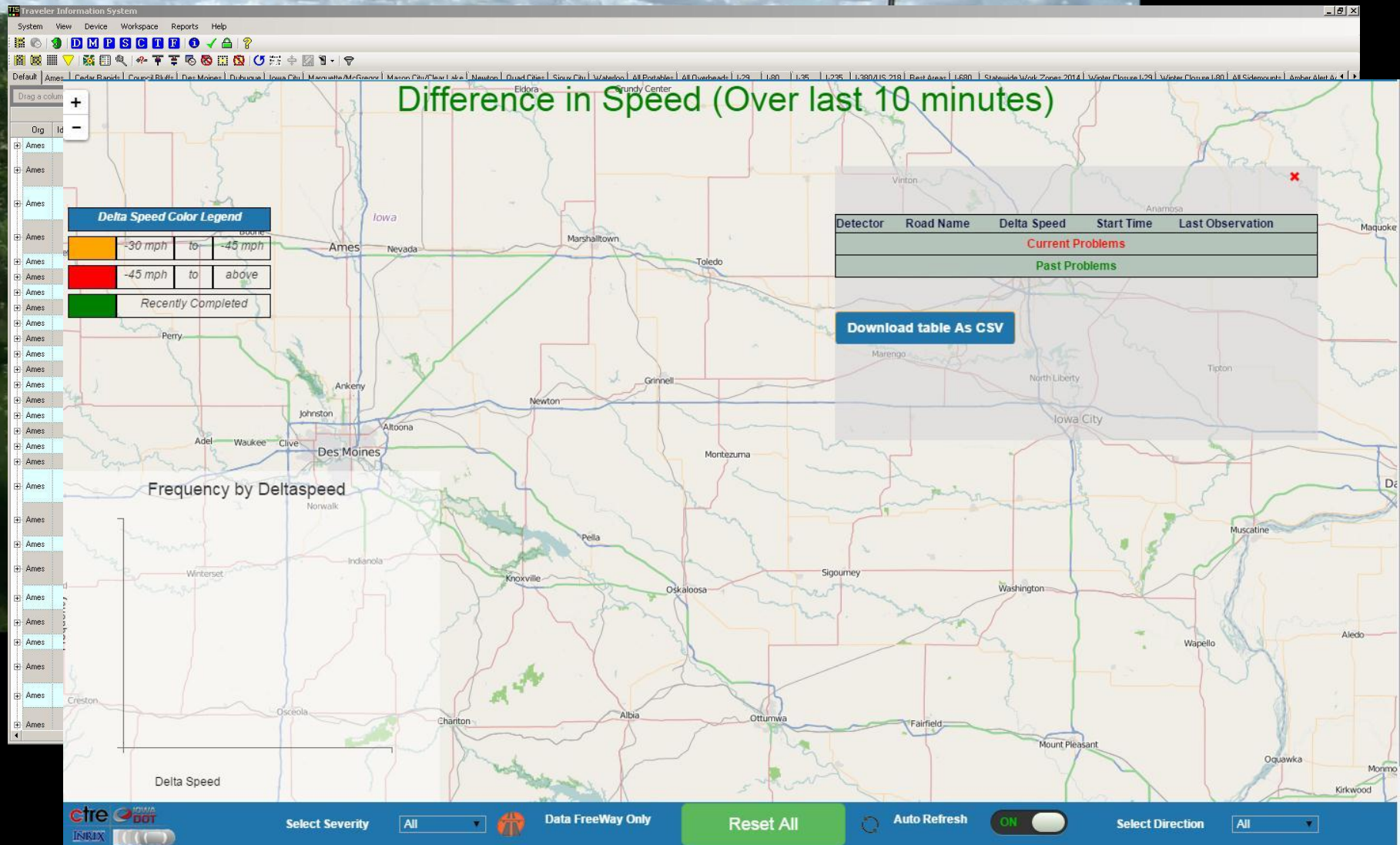
System View Device Workspace Reports Help

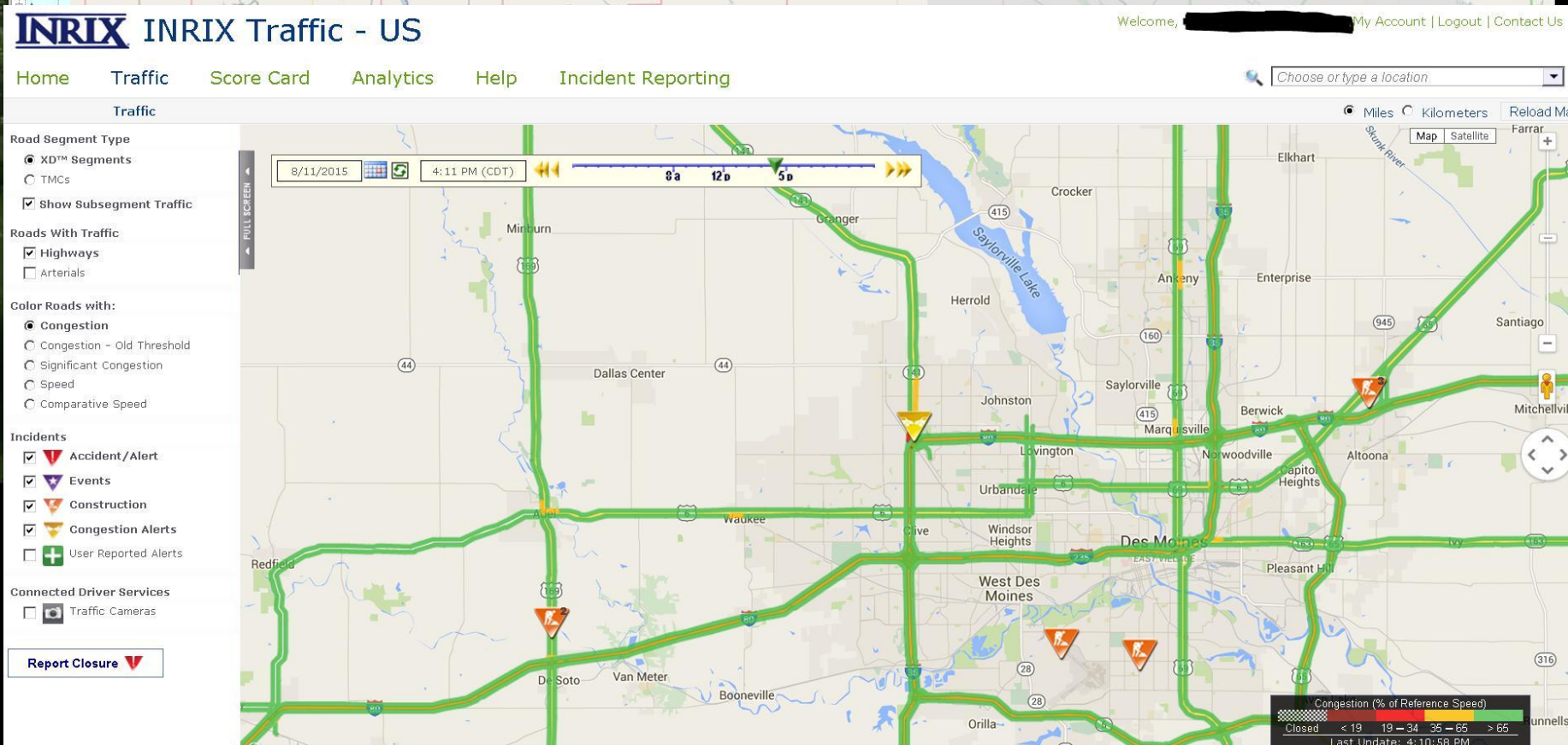
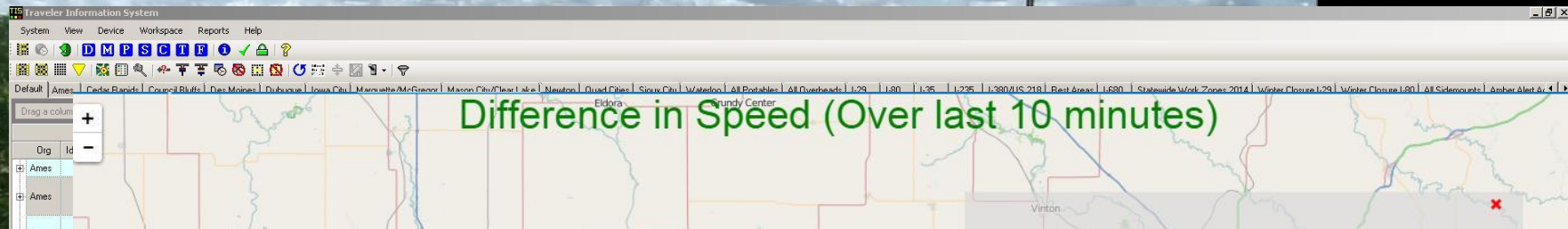
Default Ames Cedar Rapids Council Bluffs Des Moines Dubuque Iowa City Marquette/McGregor Mason City/Clear Lake Newton Quad Cities Sioux City Waterloo All Portables All Overheads I-29 I-80 I-35 I-235 I-380/US 218 Rest Areas I-680 Statewide Work Zones 2014 Winter Closure I-29 Winter Closure I-80 All Sidemounts Amber Alert A

Drag a column header here to group by that column.

| Device |    |           |  |                              |         |                                  |                                   |     |         |         |                |     |     |
|--------|----|-----------|--|------------------------------|---------|----------------------------------|-----------------------------------|-----|---------|---------|----------------|-----|-----|
| Orig   | Id | Status    | Phase 1  | Phase 2                      | Beacons | Name                             | Description                       | Dir | Route   | MP      | LRS            | M/D | Hyb |
| Ames   | 1  |           |  |                              |         | I-35 NB @ Mills Civic-OH         | DM I-35 NB @ Mills Civic          | N   | I 35    | 70.3    | DM-035NBDM-1   |     |     |
| Ames   | 2  | MSG       | WEST MIDMASTER<br>VIA 235 15 MIN<br>VIA 80/35 14 MIN |                              | Off     | I-35 SB @ Corp Woods-OH          | DM I-35 SB @ Corp Woods           | S   | I 35    | 88.4    | DM-035SBDM-2   |     |     |
| Ames   | 3  | MSG       | EAST MIDMASTER<br>VIA 235 16 MIN<br>VIA 80/35 15 MIN |                              | Off     | I-80 EB @ Jordan Creek-OH        | DM I-80 EB @ Jordan Creek         | E   | I 80    | 120.629 | DM-080EBDM-3   |     |     |
| Ames   | 4  | MSG       | WEST MIDMASTER<br>VIA 235 16 MIN<br>VIA 80/35 15 MIN |                              | Off     | I-80 WB @ 4-Mile-OH              | DM I-80 WB @ 4-Mile               | W   | I 80    | 139.555 | DM-080WBDM-4   |     |     |
| Ames   | 5  | Comm Fail |  |                              |         | B38222 CB South - PT             | B38222 CB South                   | All |         | 0       |                |     |     |
| Ames   | 6  |           |  |                              |         | I-35 NB @ Cumming-OH             | DM I-35 NB @ Cumming              | N   | I 35    | 66.575  | DM-035NBDM-6   |     |     |
| Ames   | 7  | Offline   |  |                              |         | C - I-80 WB @ Altoona-OH         | Construction - DM I-80 WB Altoona | W   | I 80    | 142.995 | DM-080WBDM-7   |     |     |
| Ames   | 8  |           |  |                              |         | B38217 WDM - PT                  | B38217 WDM                        | All |         | 0       |                |     |     |
| Ames   | 12 |           |  |                              |         | I-80 EB @ E of E 14th-SM         | DM I-35/80 EB @ E of E 14th       | E   | I 35/80 | 137     | DM-3580EBDM-12 |     |     |
| Ames   | 13 |           |  |                              |         | I-80 EB @ Walcott-OH             | IA QC I-80 EB @ Walcott           | E   | I 80    | 287.49  | QC-080EBDM-13  |     |     |
| Ames   | 14 |           |  |                              |         | I-380 NB @ 76th-OH               | CR I-380 NB @ 76th                | N   | I 380   | 15.018  | CR-380NBDM-14  |     |     |
| Ames   | 15 | Comm Fail |  |                              |         | B38220 Waterloo - PT             | B38220 Waterloo                   | All |         | 0       |                |     |     |
| Ames   | 16 |           |  |                              |         | I-235 EB @ 73rd - PT - B38224    | B38224 Des Moines                 | E   | I 235   | 3.5     |                |     |     |
| Ames   | 19 |           |  |                              |         | I-80 WB @ S of Hickman-SM        | DM I-35/80 SB @ S of Hickman      | S   | I 35/80 | 124.72  | DM-3580SBDM-19 |     |     |
| Ames   | 20 |           |  |                              |         | IA 175 E of Eldora - B38218 - PT | B38218 Waterloo                   | W   | IA 175  | 188     |                |     |     |
| Ames   | 21 | Comm Fail |  |                              |         | I-35 SB @ MM 93.85 - B38219 - PT | B38219 Des Moines                 | S   | I-35    | 93.85   |                |     |     |
| Ames   | 22 | Offline   |  |                              |         | B38226 DM - PT                   | B38226 Des Moines                 | All |         | 0       |                |     |     |
| Ames   | 23 |           |  |                              |         | B38229 Grimes - PT               | B38229 Grimes                     | All |         | 0       |                |     |     |
| Ames   | 25 | MSG       | 63RD 3<br>KEO 6<br>MINUTES                           |                              | Off     | I-235 EB @ 42nd WDM-SM           | DM I-235 EB @ 42nd WDM            | E   | I 235   | 1       | DM-235EBDM-25  |     |     |
| Ames   | 26 | MSG       | HICKMAN<br>1<br>MINUTES                              | WEST MIX<br>3<br>MINUTES     | Off     | I-80 WB @ N of Douglas-SM        | DM I-35/80 SB @ N of Douglas      | S   | I 35/80 | 126.9   | DM-3580SBDM-26 |     |     |
| Ames   | 27 |           |  |                              |         | B38228 DeSoto - PT               | B38228 DeSoto                     | All |         | 0       |                |     |     |
| Ames   | 29 | MSG       | MEDIAN<br>CLOSED<br>AT 18/71                         | STARTING<br>MONDAY<br>AUG 17 | Off     | B38221 Rockwell City - PT        | B38221 Rockwell City              | All |         | 0       |                |     |     |
| Ames   | 31 | MSG       | DOWNTOWN<br>63RD 3 MIN                               |                              | Off     | I-235 WB @ Washington-OH         | DM I-235 SB @ Washington          | W   | I 235   | 10.8    | DM-235SBDM-31  |     |     |
| Ames   | 32 | MSG       | DOWNTOWN<br>E 14TH 3 MIN                             |                              | Off     | I-235 EB @ 31st St-OH            | DM I-235 EB @ 31st St             | E   | I 235   | 6.15    | DM-235EBDM-32  |     |     |
| Ames   | 33 | Offline   |  |                              |         | B38223 DM North - PT             | B38223 DM North                   | All |         | 0       |                |     |     |
| Ames   | 36 | MSG       | IA 141<br>3<br>MINUTES                               | MERLE<br>HAY 7<br>MINUTES    | Off     | I-80 EB @ S of Hickman-SM        | DM I-35/80 NB @ S of Hickman      | E   | I 35/80 | 124.57  | DM-3580NBDM-36 |     |     |
| Ames   | 37 | MSG       | I-80/35 2 MIN<br>JORDAN CRK 4 MIN                    |                              | Off     | I-235 WB @ 17th in WDM-OH        | DM I-235 WB @ 17th in WDM         | W   | I 235   | 2.65    | DM-235WBDM-37  |     |     |
| Ames   | 38 | MSG       | 2ND AVE<br>1   | EAST MIX<br>4                | Off     | I-80 EB @ Morningstar-SM         | DM I-35/80 EB @ Morningstar       | E   | I 35/80 | 133.8   | DM-3580EBDM-38 |     |     |




















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 **Menu**


 **Personalize your 511**


 **Travel At-A-Glance**

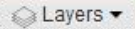
 **Incidents**

 **Construction**

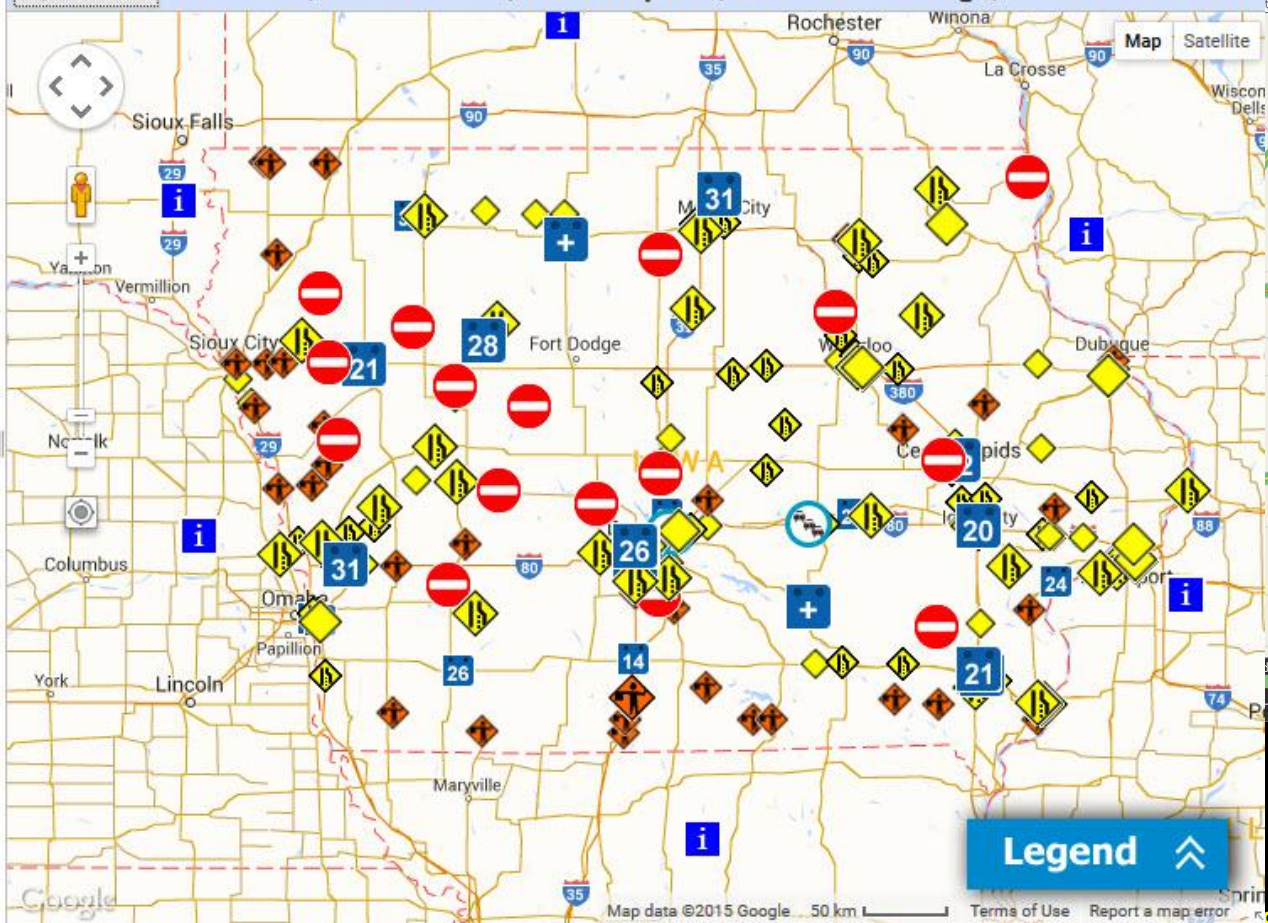
 **Cameras & Speeds**


 **Twitter**


 **Facebook**


 **Layers**

**Incidents, Construction, Waze Reports, Weather Warnings, Other States' Info**



 **Map**

 **Satellite**

 **Legend**

Map data ©2015 Google 50 km Terms of Use Report a map error



- Def
- Dr
- Road
- Col
- Inc
- Co

FLEUR DRIVE CLOSED  
BY FLOODING  
SOUTH OF M L KING

31st Street

Map navigation controls including a search bar, zoom in (+) and zoom out (-) buttons, a compass, and a map showing a route through a city area with labels like 'Mitchellville' and '316'.

# Our Principles:

**Quick Clearance**

**Responder Safety**

**Clear, interoperable  
communications**



## Multiple Benefits

- Increased survival rate of crash victims
- Reduced delay
- Improved response time
- Improved air quality
- Reduced occurrence of secondary incidents
- Improved safety of responders, crash victims and other motorists
- Reduced recovery time

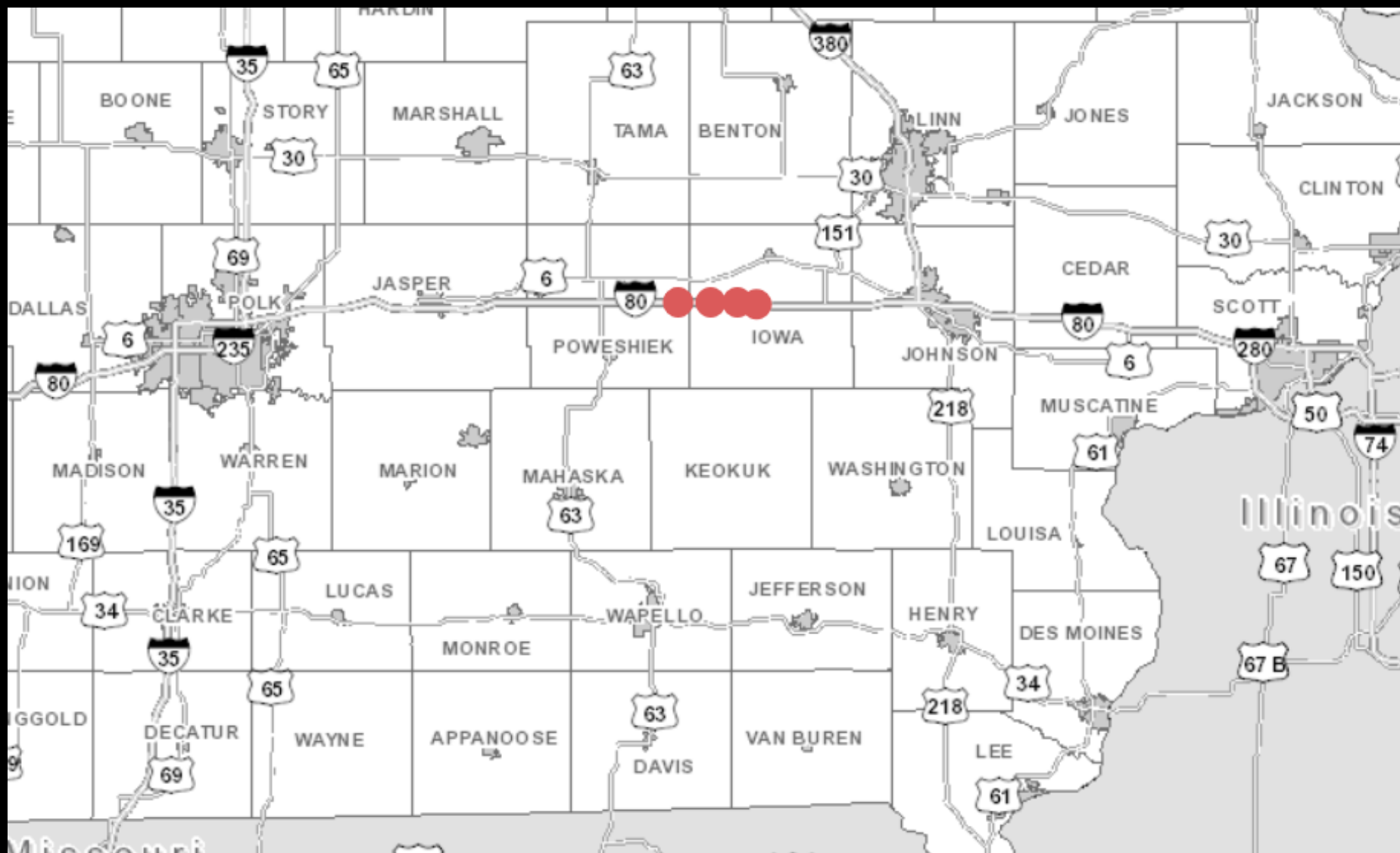
# After Action Review

## I-80 Traffic Incident And Three Secondary Incidents

May 8, 2015

# After Action Review

- **Proactive**
- **Multi-agency Response**
- **Detour**





# Stalled Semi and Fire

## Mile Marker 203 WB









# Two Vehicle Crash

## Mile Marker 208 WB

# Six Vehicle Crash

## Mile Marker 215 WB



# Collision May 8, 2015 Vehicles Involved

12 Vehicle Collision with semi-trailer  
I-80 Exit 100



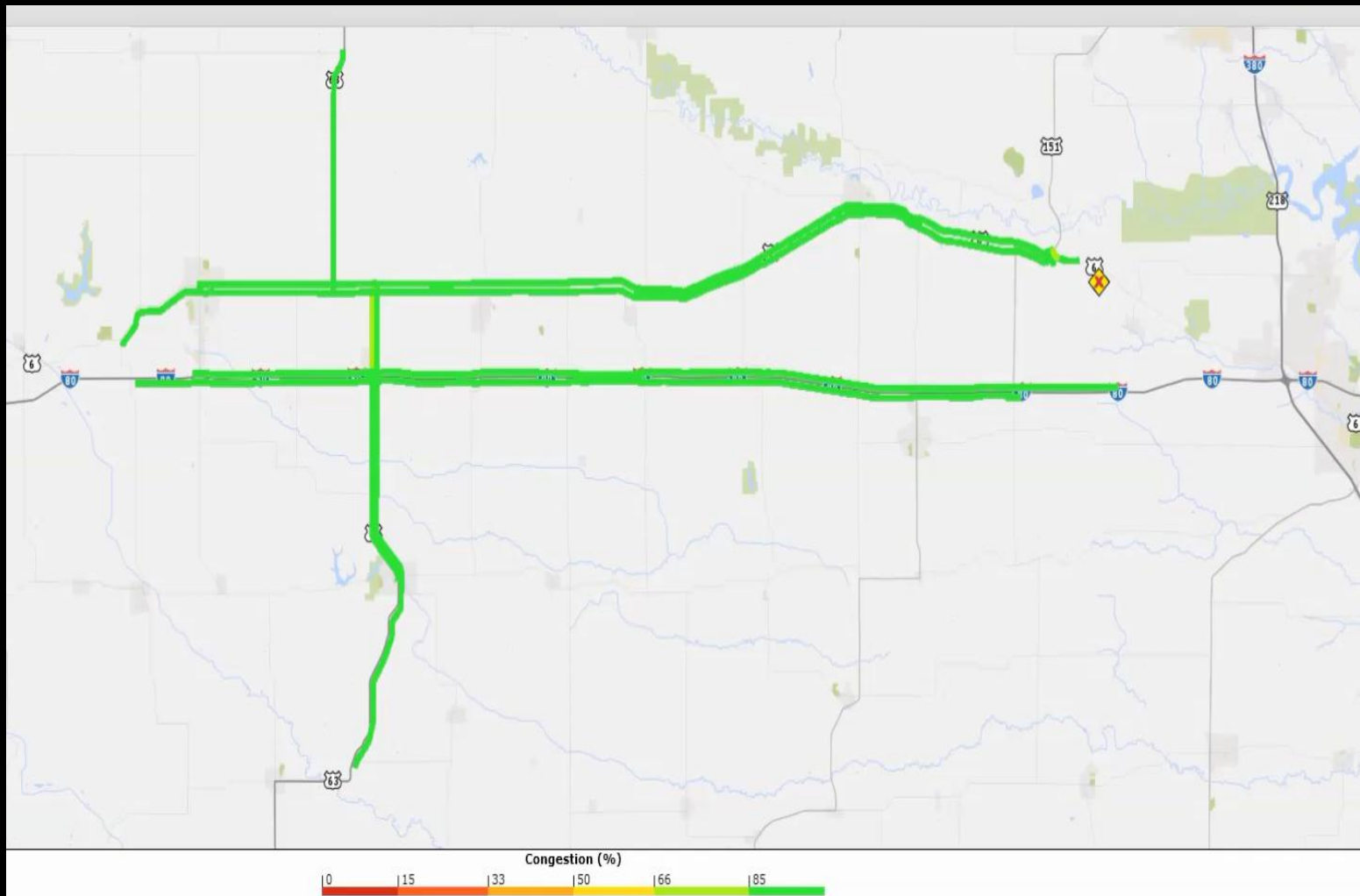


# Two Vehicle Crash

## Mile Marker 212 EB

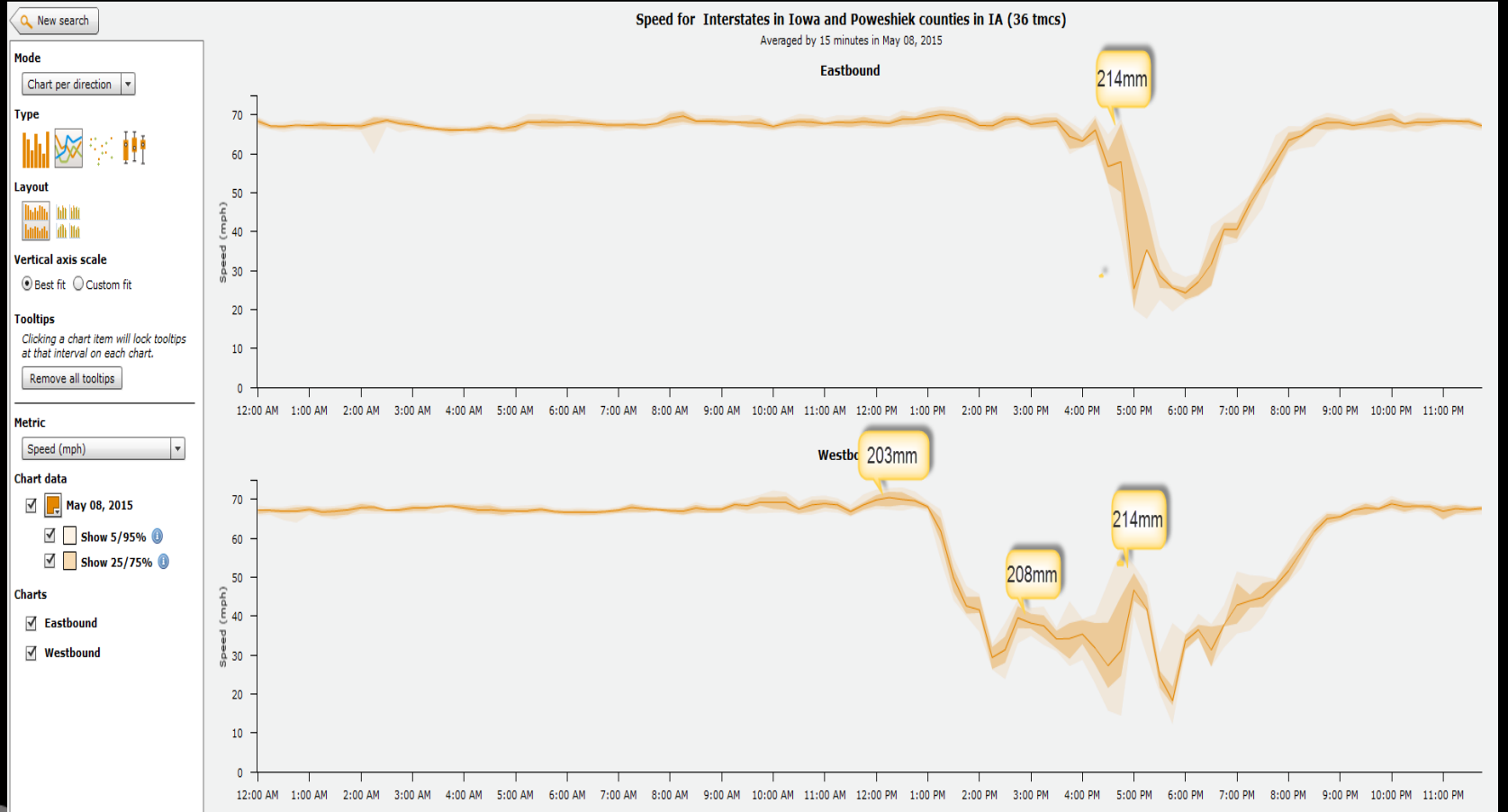






## Performance Charts

Switch to...





Friday, May 08, 2015 to Friday, May 08, 2015

I80 Williamsburg

**Please be advised...**

- The per-person and per-vehicle costs shown are lower bounds. This algorithm is at its most accurate with contiguous freeway TMCs (as opposed to networks of roads or arterials).

**Report parameters**

- Vehicle costs**
  - 2015 - Passenger: \$16.79 Commercial: \$86.81
- Percentage of vehicles (weighted on segment length)**
  - 2015 - Passenger: 90% Commercial: 10%
- Delay is calculated against the freeway speed for segments whose speeds fall 10 mph or more below freeway.

**Vehicle Type** 
**Display**

Total Cost

|               | 12 AM | 1 AM | 2 AM | 3 AM | 4 AM | 5 AM | 6 AM | 7 AM | 8 AM | 9 AM | 10 AM | 11 AM | 12 PM | 1 PM   | 2 PM  | 3 PM  | 4 PM    | 5 PM    | 6 PM    | 7 PM    | 8 PM   | 9 PM   | 10 PM | 11 PM | Daily Totals             |
|---------------|-------|------|------|------|------|------|------|------|------|------|-------|-------|-------|--------|-------|-------|---------|---------|---------|---------|--------|--------|-------|-------|--------------------------|
| 5/08/15       | \$0K  | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K  | \$0K  | \$0K  | \$5.4K | \$23K | \$24K | \$42.5K | \$90.5K | \$53.7K | \$12.1K | \$1.9K | \$0.1K | \$0K  | \$0K  | \$253.2K                 |
| Hourly Totals | \$0K  | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K | \$0K  | \$0K  | \$0K  | \$5.4K | \$23K | \$24K | \$42.5K | \$90.5K | \$53.7K | \$12.1K | \$1.9K | \$0.1K | \$0K  | \$0K  | Grand Total \$253,217.39 |

[Export to Excel](#)

Want to know how the user delay cost is calculated? Read more in our [documentation](#).

**Notes**

- The values in the 'Total cost' display mode are rounded to the nearest hundredth and displayed in thousands when values larger than \$1K exist.
- The range of values for the colored backgrounds of each cell are based on the data of the selected display mode.
- Delay metrics are displayed for every hour of every day within the selected time range.
- The totals for every hour are shown in the bottom row while the totals for every day are shown in the rightmost column.
- The grand total for the entire time period is shown as the actual value and displayed at the bottom right corner.
- Volumes shown for each hour are summed across all road segments.

**Legend**



Daily Totals

\$253.2K

Grand Total

\$253,217.39

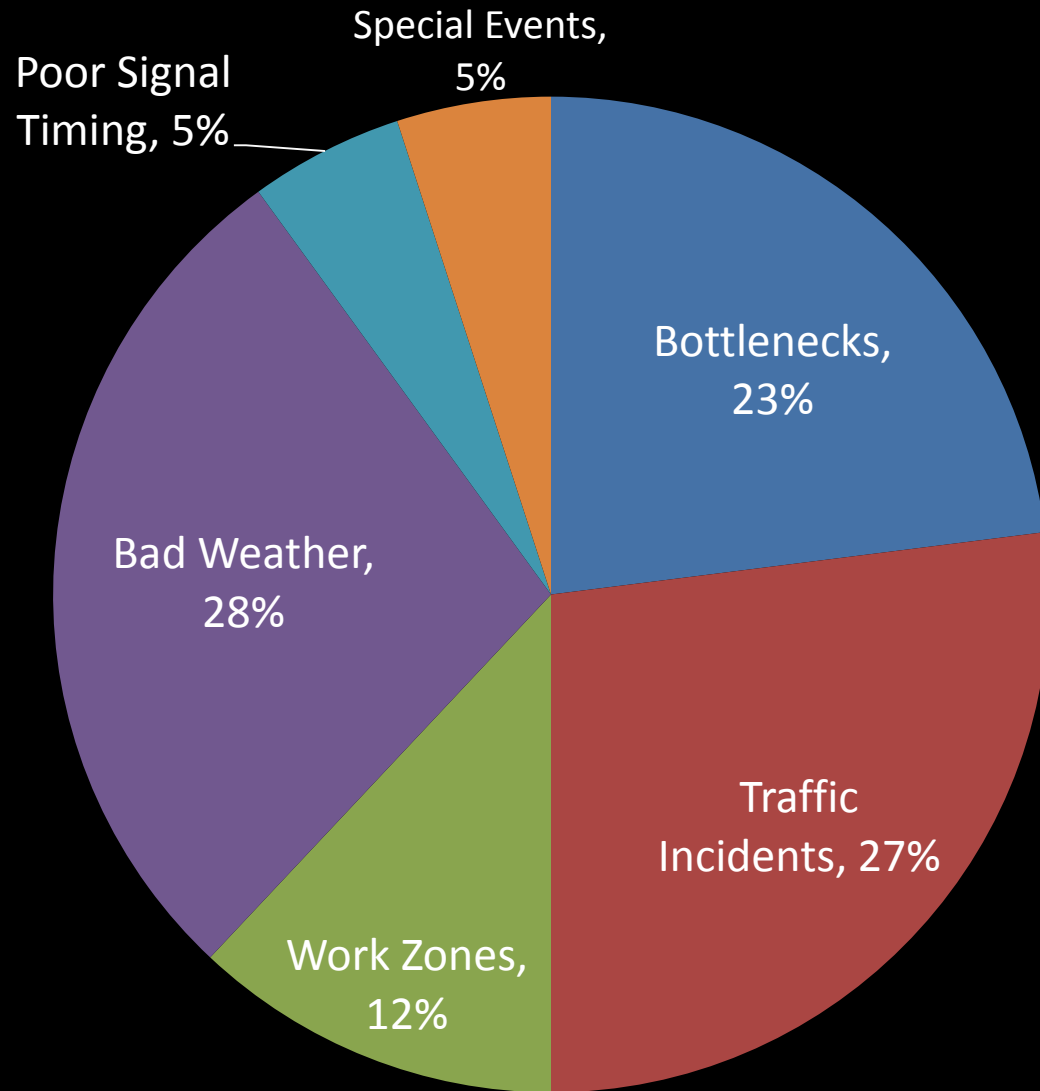
- **Primary incident led to 3 secondary incidents**
- **17 mile traffic queue**
- **Detour enacted in 35 minutes**
- **4 hours to clear major incident**

- > 30 Injuries
- NO Fatalities

*There is more to life than increasing  
its speed.*

*- Mahatma Gandhi*

# Six Causes Of Congestion In Iowa





**\$160 Billion**

**\$28 Billion**

**\$380 Million**

# TSMO

Transportation  
Systems  
Management &  
Operations

Transportation Systems Management and Operations (TSMO) is a cross-cutting approach meant to optimize existing infrastructure through better integration, coordination, and systematic implementation of key operational strategies.

# TSMO Strategic Plan

## COMPONENTS

Iowa's Challenge  
The Case for TSMO  
Mission and Vision  
*Strategic* Goals and Objectives  
Program Plan Overview

## AUDIENCE

All Levels of DOT

# TSMO Program Plan

## COMPONENTS

*Program* Goals and Objectives  
TSMO Interaction with other DOT Programs  
Leadership and Organization  
Business Processes and Resources  
Interstate Conditions Evaluation – Traffic Operations (ICE-OPS) Analysis  
Performance Management and Decision Support Plan  
5-Year TSMO Program Budget  
Service Layers Overview

## AUDIENCE

Agency Leadership

# TSMO Service Layer Plans

## COMPONENTS

Opportunities and Challenges  
Description of Services, Activities and Projects  
Existing Conditions  
Gap Analysis  
Recommendations  
5-Year Service Layer Cost Estimate

## 8 Service Layer Plans

Traffic Management Center  
ITS and Communications  
Traveler Information  
Traffic Incident Management  
Emergency Transp. Operations  
Work Zone Management  
Active Transportation and Demand Management  
Connected and Autonomous Vehicle

## AUDIENCE

Staff involved with TSMO

Strategic → Programmatic → Tactical